

WHAT IS CLAIMED IS:

- 1 1. A method for constructing a packet comprising:
2 receiving a request to construct one packet, including information on at least one
3 header and a payload to include in the packet;
4 generating the at least one header for the received request;
5 writing the generated at least one header in a first queue;
6 requesting the payload to include in the packet;
7 writing the received payload to a second queue;
8 reading the generated at least one header and payload from the first and second
9 queues; and
10 including the read at least one header and payload in the packet..

1 2. The method of claim 1, further comprising:
2 transmitting the constructed packet to a target node.

1 3. The method of claim 1, further comprising:
2 signaling header complete in response to writing one header to the first queue;
3 and
4 signaling payload complete in response to writing the payload to the second
5 queue.

1 4. The method of claim 3, wherein the at least one header and payload are
2 included in the packet in response to receiving signals that all headers for the packet to
3 construct are written to the first queue and the payload for the packet to construct is
4 written to the second queue.

1 5. The method of claim 4, wherein writing the header and signaling header
2 complete are performed by a header engine, wherein writing the received payload and
3 signaling payload complete are performed by a payload engine, and wherein including
4 the read at least one header and payload in the packet are performed by a completion
5 engine in response to receiving the signals.

1 6. The method of claim 1, wherein headers and payload for a first packet
2 may be buffered in the first and second queues before a second packet preceding the first
3 packet is constructed.

1 7. The method of claim 1, further comprising:
2 in response to constructing one packet, determining whether all headers and
3 payload for a next packet according to a packet ordering are buffered in the first and
4 second queues; and
5 constructing the next packet in response to determining that all headers and
6 payload for the next packet are buffered in the first and second queues.

1 8. The method of claim 1, further comprising:
2 accessing the payload from a system memory in response to receiving the request,
3 wherein the accessed payload is written to the second queue.

1 9. The method of 1, wherein writing the at least one header to the first queue,
2 writing the payload to the second queue, and reading the at least one header and payload
3 from the first and second queues are performed in different clock domains.

1 10. The method of claim 9, wherein headers are written to the first queue in a
2 first clock domain, payloads are written to the second queue in a second clock domain,
3 and headers and payloads are read from the first and second queues, respectively, in a
4 third clock domain.

1 11. The method of claim 1, further comprising:
2 queuing a work request including the request to construct the packet in a send
3 queue that is in one of a plurality of queue pairs, wherein each queue pair includes one
4 send queue and one receive queue; and
5 interpreting the work request to determine the at least one header and payload for
6 the packet to construct, wherein the determined at least one header is generated and the
7 determined payload is requested.

1 12. The method of claim 1, wherein one packet to construct may include at
2 least one header and no payload, and wherein the at least one generated header is
3 included in the packet in response to receiving signals indicating that the headers have
4 been generated and determining that the packet to construct does not include payload.

1 13. A channel adaptor, wherein the channel adaptor
2 includes logic to enable the channel adaptor to perform:
3 receive a request to construct one packet, including information on at least one
4 header and a payload to include in the packet;
5 generate the at least one header for the received request;
6 write the generated at least one header in a first queue;
7 request the payload to include in the packet;
8 write the received payload to a second queue;
9 read the generated at least one header and payload from the first and second
10 queues; and
11 include the read at least one header and payload in the packet.

1 14. The channel adaptor of claim 13, wherein the channel adaptor logic is
2 further capable of causing the channel adaptor to perform:
3 transmitting the constructed packet to a target node.

1 15. The channel adaptor of claim 13, wherein the channel adaptor logic is further
2 capable of causing the channel adaptor to perform:
3 signaling header complete in response to writing one header to the first queue;
4 and
5 signaling payload complete in response to writing the payload to the second
6 queue.

1 16. The channel adaptor of claim 15, wherein the at least one header and
2 payload are included in the packet in response to receiving signals that all headers for the

3 packet to construct are written to the first queue and the payload for the packet to
4 construct is written to the second queue.

1 17. The channel adaptor of claim 16, further comprising:
2 a header engine to perform the operations of writing the header and signaling
3 header complete;
4 a payload engine to perform the operations of writing the received payload and
5 signaling payload complete; and
6 a completion engine to perform the operations of including the read at least one
7 header and payload in the packet in response to receiving the signals.

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1 18. The channel adaptor of claim 13, wherein headers and payload for a first
2 packet may be buffered in the first and second queues before a second packet preceding
3 the first packet is constructed.

1 19. The channel adaptor of claim 13, wherein the channel adaptor logic further
2 enables the channel adaptor to perform:
3 in response to constructing one packet, determining whether all headers and
4 payload for a next packet according to a packet ordering are buffered in the first and
5 second queues;
6 constructing the next packet in response to determining that all headers and
7 payload for the next packet are buffered in the first and second queues.

1 20. The channel adaptor of claim 13, wherein the channel adaptor logic further
2 enables the channel adaptor to perform:
3 accessing the payload from a system memory in response to receiving the request,
4 wherein the accessed payload is written to the second queue.

1 21. The channel adaptor of 13, wherein writing the at least one header to the
2 first queue, writing the payload to the second queue, and reading the at least one header
3 and payload from the first and second queues are performed in different clock domains.

1 22. The channel adaptor of claim 21 , wherein headers are written to the first
2 queue in a first clock domain, payloads are written to the second queue in a second clock
3 domain, and headers and payloads are read from the first and second queues,
4 respectively, in a third clock domain.

1 23. The channel adaptor of claim 12, wherein the channel adaptor logic is
2 further capable of causing the channel adaptor to perform:
3 queuing a work request including the request to construct the packet in a send
4 queue that is in one of a plurality of queue pairs, wherein each queue pair includes one
5 send queue and one receive queue; and
6 interpreting the work request to determine the at least one header and payload for
7 the packet to construct, wherein the determined at least one header is generated and the
8 determined payload is requested.

1 24. A system, comprising:
2 a host processor;
3 a magnetic storage medium;
4 a memory in communication with the host processor and including a payload to
5 transmit in a packet, wherein a copy of the payload is stored in the magnetic storage
6 medium; and
7 a channel adaptor in communication with the memory, wherein the channel
8 adaptor includes logic to enable the channel adaptor to perform:
9 (i) receiving a request to construct one packet, including information on at
10 least one header and a payload to include in the packet;
11 (ii) generating the at least one header for the received request;
12 (iii) writing the generated at least one header in a first queue;
13 (iv) requesting the payload to include in the packet;

- 14 (v) writing the received payload to a second queue;
- 15 (vi) reading the generated at least one header and payload from the first
- 16 and second queues; and
- 17 (vii) including the read at least one header and payload in the packet.

1 25. The system of claim 24, wherein headers and payload for a first packet
2 may be buffered in the first and second queues before a second packet preceding the first
3 packet is constructed.

1 26. The system of claim 25, wherein the channel adaptor logic further enables
2 the channel adaptor to perform:
3 in response to constructing one packet, determining whether all headers and
4 payload for a next packet according to a packet ordering are buffered in the first and
5 second queues;
6 constructing the next packet in response to determining that all headers and
7 payload for the next packet are buffered in the first and second queues.

1 27. An article of manufacture for constructing a packet, wherein the article of
2 manufacture is capable of causing operations to be performed, the operations comprising:
3 receiving a request to construct one packet, including information on at least one
4 header and a payload to include in the packet;
5 generating the at least one header for the received request;
6 writing the generated at least one header in a first queue;
7 requesting the payload to include in the packet;
8 writing the received payload to a second queue;
9 reading the generated at least one header and payload from the first and second
10 queues; and
11 including the read at least one header and payload in the packet.

1 28. The article of manufacture of claim 27, wherein the operations further
2 comprise:
3 transmitting the constructed packet to a target node.

1 29. The article of manufacture of claim 27, wherein the operations further
2 comprise:
3 signaling header complete in response to writing one header to the first queue;
4 and
5 signaling payload complete in response to writing the payload to the second
6 queue.

1 30. The article of manufacture of claim 29, wherein the at least one header and
2 payload are included in the packet in response to receiving signals that all headers for the
3 packet to construct are written to the first queue and the payload for the packet to
4 construct is written to the second queue.

1 31. The article of manufacture of claim 30, wherein writing the header and
2 signaling header complete are performed by a header engine, wherein writing the
3 received payload and signaling payload complete are performed by a payload engine, and
4 wherein including the read at least one header and payload in the packet are performed by
5 a completion engine in response to receiving the signals.

1 32. The article of manufacture of claim 27, wherein headers and payload for a
2 first packet may be buffered in the first and second queues before a second packet
3 preceding the first packet is constructed.

1 33. The article of manufacture of claim 27, wherein the operations further
2 comprise:
3 in response to constructing one packet, determining whether all headers and
4 payload for a next packet according to a packet ordering are buffered in the first and
5 second queues; and

6 constructing the next packet in response to determining that all headers and
7 payload for the next packet are buffered in the first and second queues.

1 34. The article of manufacture of claim 27, wherein the operations further
2 comprise:

3 accessing the payload from a system memory in response to receiving the request,
4 wherein the accessed payload is written to the second queue.

1 35. The article of manufacture of claim 27, wherein writing the at least one
2 header to the first queue, writing the payload to the second queue, and reading the at least
3 one header and payload from the first and second queues are performed in different clock
4 domains.

1 36. The article of manufacture of claim 35, wherein headers are written to the
2 first queue in a first clock domain, payloads are written to the second queue in a second
3 clock domain, and headers and payloads are read from the first and second queues,
4 respectively, in a third clock domain.

1 37. The article of manufacture of claim 27, wherein the operations further
2 comprise:

3 queuing a work request including the request to construct the packet in a send
4 queue that is in one of a plurality of queue pairs, wherein each queue pair includes one
5 send queue and one receive queue; and

6 interpreting the work request to determine the at least one header and payload for
7 the packet to construct, wherein the determined at least one header is generated and the
8 determined payload is requested.

1 38. The article of manufacture of claim 27, wherein one packet to construct
2 may include at least one header and no payload, and wherein the at least one generated
3 header is included in the packet in response to receiving signals indicating that the

- 4 headers have been generated and determining that the packet to construct does not
- 5 include payload.